REMARKS

I. Status Summary

Claims 1-108 are pending in the present application. Claims 5-9, 22-96, and 102-107 are withdrawn from consideration. Claim 1 has been amended, and claim 108 has been added, which depends from claim 1. Claims 1-4, 10-21, and 97-101 presently stand rejected. Applicants respectfully submit the amendment to claim 1 does not raise issues of new matter and does not require further consideration or search by the Examiner. Further, Applicants respectfully submit that the amendment and the remarks below place claims 1-4, 10-21, 97-101, and 108 in condition for allowance or in better condition for appeal, as discussed in greater detail below. Reconsideration of the application and entry of the amendment is respectfully requested.

II. Claim Rejection - 35 U.S.C. § 103

Claims 1, 4, 97 and 98 stand rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No 2,073,933 to Herbst (hereinafter "Herbst") in view of any one of U.S. Patent No. 3,277,564 to Webber et al. (hereinafter "Webber"), U.S. Patent No. 4,931,616 to Usui et al. (hereinafter "Usui"), or U.S. Patent No. 4,590,120 to Klein (hereinafter "Klein").

Claims 1, 4, 97 and 98 stand rejected under 35 U.S.C. § 103(a) as being upatentable over U.S. Patent No. 1,745,096 to Jayne (hereinafter "Jayne") in view of any one of Webber, Usui or Klein.

Claims 2 and 3 stand rejected under 35 U.S.C. § 103(a) as being upatentable over Herbst in view of any one of Webber, Usui or Klein as applied to claims 1, 4, 97, and 98 above, and further in view of U.S. Patent No. 3,795,760 to Raw et al. (hereinafter "Raw").

Claims 2 and 3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jayne in view of Webber, Usui or Klein as applied to claims 1, 4, 97 and 98 above, and further in view of Raw.

Claims 10-12 and 15-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,906,004 to Lebby et al. (hereinafter "Lebby") in view of Herbst and further in view of U.S. Patent No. 4,552,989 to Sass (hereinafter "Sass").

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being upatentable over Lebby in view of Herbst in view of Sass as applied to claims 10-12 and 15-21 above, and further in view of Raw.

Claims 99-101 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lebby in view of Herbst in view Sass as applied to claims 10-12 and 15-21 above, and further in view of any one of Webber, Usui or Klein. Each of these rejections is respectfully traversed.

To establish *prima face* case of obviousness, the Examiner must meet the following criteria. First, there must be some suggestion or motivation either in the reference itself or the knowledge generally available to one of ordinary skill of the art, to modify the reference. See MPEP § 2143. Second, there must be a reasonable

expectation of success. Id. Third, the prior art reference must teach or suggest all the claim elements. Id. In view of all the factual information, a determination must then be made as to whether the claimed subject matter as a whole would have been obvious at the time to that person. See MPEP § 2142. Impermissible hindsight must be avoided and a legal conclusion of obviousness must be reached on the basis from the facts gleaned from the prior art. Id. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. See MPEP §2143.01.

II. A. Summary of the Rejected Independent Claims

Independent claim 1 of the present application is directed to a coaxial conductive yarn structure that includes at least a first conductive yarn and a second conductive yarn. The first conductive yarn extends in a first direction and has a plurality of first conductive strands being twisted together. The second conductive yarn has a plurality of second conductive strands being twisted together. The second conductive yarn is wrapped around the first conductive yarn during a weaving process in a second direction transverse to the first direction and covering the first conductive yarn. At least one insulating layer electrically isolates the first and second conductive yarns from each other. Further, the first and second conductive yarns exhibit at least one of sufficient flexibility, conformability, resiliency, bending

characteristics, and recovery for incorporation in a wearable garment. (Emphasis added.)

Independent claim 10 of the present application is directed to a woven electrical network. The woven electrical network includes a first coaxial conductive yarn structure being woven into a fabric in a first direction. The first coaxial conductive yarn structure includes an inner conductive yarn and an outer conductive yarn being wound around the inner conductive yarn in a second direction transverse to the first direction and substantially covering the inner conductive yarn. At least one insulating layer electrically isolates the inner and outer conductive yarns from each other with the outer conductive yarn being connected to ground. The woven electrical network also includes a second coaxial conductive yarn structure being woven into the fabric in the first direction and being spaced from the first coaxial conductive yarn structure. The second coaxial conductive yarn structure includes an inner conductive yarn, an outer conductive yarn being wound around the inner conductive yarn in a second direction transverse to the first direction and substantially covering the inner conductive yarn. An insulating layer electrically isolates the inner and outer conductive yarns from each other with the outer conductive yarn being connected to ground. The woven electrical network further includes an AC signal source being connected to the inner conductive yarn of the first coaxial conductive yarn structure for sending an AC signal over the first coaxial conductive yarn structure. The grounded outer conductive yarns of the first and second coaxial conductive yarn structures block electromagnetic fields emanating

from the inner conductive yarn of the first coaxial conductive yarn structure and thereby reduce crosstalk between the first and second coaxial conductive yarn structures. (Emphasis added.)

II. B. Arguments Against the Rejection of the Claims Based on 35 U.S.C. § 103(a)

Regarding claim 1, Applicants respectfully submit that Herbst, Webber, Usui, or Klein, either singularly or in combination, do not disclose, teach, or suggest each and every feature of claim 1. In particular, these references do not disclose, teach, or suggest a coaxial conductive yarn having a second conductive yarn being wrapped around a first conductive yarn during a weaving process in a second direction transverse to a first direction in which the first conductive yarn extends.

Herbst discloses radio frequency energy distribution systems that employ transmission lines for distributing collected broadcast energy to a variety of independent radio receivers. (See Herbst, col. 1, lines 1-9.) The transmission line 2 can comprise a pair of conductors 5, 6. The conductor 6 is spiralled around conductor 5. (See Herbst, col. 2, lines 14-19.) The conductors 5 and 6 comprise conventional wires. (See Herbst, col. 3, lines 3-21.) Herbst does not disclose, teach, or suggest that the construction of the transmission line having the second conductive wire 6 wrapped in a spiral orientation around the first conductive wire 5 is formed during a weaving process. Herbst only discloses the use of such transmission lines within buildings and does not disclose, teach, or suggest that such a construction could occur during a fabric formation process.

Webber discloses a process of forming a plurality of filaments. Larger diameter wire is annealed and drawn until the final outer diameter of the wire is a fraction of its original diameter such that the wires constitute filaments. (See Webber, col. 3, lines 35-55 and examples 1-6.) However, Webber does not disclose, teach, or suggest a first filament that extends in a first direction with a second filament being wrapped around the first filament in a transverse direction during a weaving process.

Usui discloses the use of thin conductors with the diameter of 20 microns used within a flat cable and Klein discloses the use of thin conducting fiber that are covered by a transparent partially conductive layer of plastic material to produce a chair mat that is relatively free of static. Neither Usui nor Klein disclose, teach, or suggest a coaxial yarn structure. Further, neither Usui nor Klein disclose, teach, or suggest having a first conductive yarn that extends in the first direction with a second conductive yarn wrapped around the first conductive yarn during a weaving process.

Since Herbst, Webber, Usui, or Klein, either alone or in combination, do not disclose, teach, or suggest a coaxial yarn structure with a first conductive yarn extending a first direction with a second conductive yarn wrapped around the first conductive yarn in a second direction transverse to the first direction, these references, either alone or in combination, do not render claim 1 or the claims that depend therefrom obvious.

Similarly, claim 1 and the claims that depend therefrom are not rendered obvious by Jayne in view of Webber, Usui, or Klein. Jayne discloses an antenna for radio receiving sets generally having conductors with a ground wire extending in a

first direction with an antenna lead wrapped around the conductors and/or ground wires. (See Jayne, col.1, lines 1-2; col. 2, lines 57-85.) The antenna lead can be a wire that is wound spirally about the ground wire and conductors. (See Jayne, col. 3, lines 34-46.) Further, the antenna lead may also be a flexible material, which comprises interwoven strands of metal and fiber. (See Jayne, col. 5, lines 9-15.) Jayne does not disclose, teach, or suggest that the antenna leads are wrapped around the conductors and/or ground wire during a weaving process. As stated above, Webber, Usui, and Klein, also do not disclose, teach, or suggest such a construction formed during a weaving process. Therefore, Applicants respectfully submit that Jayne, Webber, Usui, and Klein, either alone or in combination, do not disclose, teach, or suggest all the features of claim 1 or the claims that depend therefrom.

Claims 2 and 3 stand rejected as being unpatenable over Herbst in view of any one of Webber, Usui, or Klein and further in view of Raw. As stated above, Herbst, Webber, Usui, and Klein, either alone or in combination, do not disclose, teach, or suggest all the features of claim 1 or the claims that depend therefrom. Claims 2 and 3 depend from claim 1. Therefore, Herbst, Webber, Usui, or Klein, either alone or in combination, do not render obvious claims 2 and 3.

Raw discloses a single wire cable conductor consisting of an inter part of an aluminum alloy of the kind known non-heat treatable and bonded to the inter part and outer part of a copper or high-conductive copper alloy. (See Raw, col. 1, lines 29-43.) The single wire cable may have an insulating covering of polyvinyl chloride. (See

Raw, col. 4, lines 31-38.) However, Raw does not disclose, teach, or suggest a coaxial yarn structure having a first conductive yarn extending in a first direction and a second conductive yarn being wrapped around the first conductive yarn in a second direction transverse to the first direction during a weaving process. Thus, Herbst, Webber, Usui, Klein, or Raw, either alone or in combination, do not disclose, teach, or suggest all features of claims 2 and 3.

Similarly, for reasons outlined above, Jayne, Webber, Usui, Klein, or Raw do not disclose, teach, or suggest all the features of claims 2 or 3, either.

Further, new claim 108 that depends from claim 1 has been added. Applicants respectfully submit that, since claim 1 is not rendered obvious by Herbst, Jayne, Webber, Usui, Klein, or Raw, alone or in combination, then claim 108 is not rendered obvious by these references, either.

Concerning independent claim 10, Applicants respectfully submit that claim 10 is not rendered obvious by Lebby in view of Herbst and further in view of Sass. In particular, no motivation to combine Lebby, Herbst, and Sass exists. Further, these references teach away from their combination as suggested by the Examiner.

Lebby discloses a textile fabric with integrated electrically conductive fibers that provide sufficient current to induce either a wired or wireless coupling between textile fabric and portable electronic device. (See Lebby, col. 2, lines 25-40.) As stated in the Summary of the Invention of Lebby, the fabric is characterized as emanating an electromagnetic field for wireless interface or could be used with a wired interface. (See Lebby, col. 2, lines 25-40; See also Lebby, col. 3, lines 1-10.)

Further, the fabric may be used as an antenna for signals received and transmitted by a portable electronic device. (See Lebby, col. 2, lines 25-40.)

In order for Lebby to allow for the possibility of wireless connection, the wires must emanate an electromagnetic field. Further, the fibers of the fabric must be able to adequately receive and transmit signals when servicing as an antenna.

Herbst, as described above, discloses a transmission line with a grounded conductor extending in a first direction with a second conductor for carrying a high potential signal through the transmission line being spiraled around the grounded conductor. (See Herbst, col. 7, lines 20-37.) The conductor carrying the signal for the transmission line is wrapped around the ground conductor such that the signal carrying conductor is on the outside of the transmission line as stated in Herbst. This design allows the transmission line to not be broken at intervals for the insertion of loading coils. (See Herbst, col. 1, lines 19-21.) This is accommodated by having the signal-carrying conductor wrapped around the grounded conductor.

Sass, on the other hand, discloses a multi-conductor cable including a plurality of miniature coaxial conductor pairs. (See Sass, abstract.) Each coaxial conductor pair includes an inner conductor supported by a very thin tubular layer of solid, relatively stiff dielectric material. (See Sass, col. 2, line 24-31.) The tubular layer is much stiffer and harder than polyvinyl chloride insulating material which is commonly used to insulate conductors. (See Sass, col. 2, lines 31-40.) The tubular layer provides mechanical support opposing short radius bending of the inner conductor of each coaxial pair thereby eliminating the flexibility of the coaxial pair. Id. The tubular

layer is surrounded by insulation wrapping having a considerably larger radial thickness than that of the tubular layer. The wrapping is of a dielectric filament or tape material. Surrounding the wrap is an outer conductor composed of a plurality of strains of wire. (See Sass, col. 2, lines 41-55.) The outer conductor may then be wrapped in a dielectric friction-resistant film. (See Sass, col. 2, lines 56-59.) As stated in Sass, the outer conductors may be at a single ground potential. (See Sass, col. 2, line 60-col. 3, line 4.)

Applicants respectfully submit that it would not have been obvious to modify Lebby and Herbst with Sass. It is clear from Lebby that it is important to have the ability to create an electromagnetic field in order for the fabric of Lebby to provide an electromagnetic field for wireless interface or to serve as an antenna for signal receipt and transmission. In order to facilitate such characteristics of the fabric, single mono-filament metallic threads are used within Lebby having a metallic core and insulated overcovering layer. While the insulated overcovering layer can decrease electrical crosstalk, it does not interfere with the ability to create electromagnetic fields that would provide the wireless interface or interfere with the fabric's ability to receive and transmit signals.

The transmission line of Herbst has a coaxial structure with a ground conductor extending in the first direction and a second conductor for carrying signal wrapped around the outside of the ground conductor. The transmission line specifically has that structure in order to provide a transmission line that need not be broken at set intervals for insertion of loading coils to provide a radio frequency

system which requires only a single amplifier between the antenna and the plurality of receivers coupled to the transmission cable.

One of ordinary skill in the art would not look to the arrangement suggested in Sass were the outer conductor strands may be connected to ground with the inner conductor carrying a signal because such a construction would change the principles of operation of Lebby. Having the grounded conductor wrapped around the signal carrying conductor would prevent the emanation of the needed electromagnetic field and would effectively prevent the operation of the fabric as an antenna. Such modification would frustrate the stated purpose of Lebby of connecting to a device using a wireless connection, a wired connection, or through inductive coupling. (See column 3, lines 24-28 of Lebby.) Wireless and inductive operation of Lebby would be prevented if the inner conductor is surrounded by a grounded outer conductor. In addition, connection to an external device via a wired connection would be prevented if the signal conductor in Lebby were surrounded by a grounded other conductor that prevents physical connection with the inner conductor. Neither Lebby nor Herbst indicates how connection to a shielded inner conductor would be made in a textile fabric. Accordingly, surrounding the conductor of Lebby with a grounded shield as taught by Herbst, would prevent interconnection with an external device using the mechanisms taught by Lebby.

Further, such a modification would prevent operation of the transmission line for the purpose stated in Herbst. For example, the stated purpose of the transmission line of Herbst is to inductively transfer energy from the transmission line

to the coupling boxes **8** and the receivers **1** that surround the transmission line. If Herbst is modified to include a grounded outer conductor, such inductive coupling would be prevented because the signal transmitted over the transmission line would be grounded by the outer conductor. Therefore, one of ordinary skill in the art would not be motivated to modify Lebby by replacing the threads with the wire structure of Herbst and further modifying the wires of Herbst such that the wires would operate contrary to the teachings of both Lebby and Herbst.

Further, even though Sass is cited for the teaching of having an outer conductor that is connected to ground and an inner conductor for carrying a signal, as a practical matter, one of ordinary skill in the art would not look to Sass to replace the threads of Lebby. The threads of Lebby must have sufficient level of flexibility and bending characteristics in order to withstand the rigors of the weaving process in order to form the fabric of Lebby. Sass specifically states that the multi-conductor cable includes a tubular layer which is much stiffer than even polyvinyl chloride to prevent short radius bending of the inner conductor. Such bending would be needed in the weaving process. Therefore, one of ordinary skill in the art would not look to the teachings of Sass in order to modify Lebby in any manner.

For these reasons set forth above, claim 10 and the claims that depend therefrom are not rendered obvious by Lebby in view of Herbst and further in view of Sass.

Similarly, claims 13 and 14, which depend from claim 10 are not rendered obvious by Lebby in view of Herbst in view of Sass and further in view of Raw. Raw

does not cure the deficiencies of the combination of Lebby, Herbst, and Sass as outlined above. Further, claims 99-101 are also not rendered obvious by Lebby in view of Herbst in view of Sass and further in view of any one of Webber, Usui, or Klein. Claims 99-100 depend from claim 10. Neither Webber nor Usui, nor Klein cure the deficiencies of the combination of Lebby, Herbst, and Sass as outlined above.

For reasons stated above, claims 1-4, 10-21, 97-101, and 108 are not rendered obvious by the cited of prior art. Therefore, the rejections of claims 1-4, 10-21, and 97-101 should be withdrawn and the claims allowed at this time.

CONCLUSION

In light of the above amendments and remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

DEPOSIT ACCOUNT

A check in the amount of $85.00 is enclosed. However, the Commissioner is hereby authorized to charge any deficiencies of payment or credit any overpayments associated with the filing of this correspondence to Deposit Account No. **50-0426**.

Respectfully submitted,

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